

like stamps, which are to be arranged methodically in an album. We have not finished with them when we have cleverly elaborated a system which ensures that we shall know exactly where to find them in the cabinets of a museum. On the contrary, they are natural groups of organic creations with independent organic histories and origins, with independent or particular areas of distribution, and doubtless with independent ecological life-stories. Are such things expressed or implied when we find in a recent and colossal work that no more can be done with a huge family like the Icteridæ than to write it down as one long continuous and tremendous list of genera, without analysis, without subdivisions or divisions, without a hint as to phylogenetic relationships or diversities, without an indication that, for all one can tell, judging solely by this method of classification, the first genus may not be closely allied in all respects with the last?

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XVI.—*Mixed Bird-parties*.

By C. F. M. SWYNNERTON, C.M.B.O.U.

THE occurrence of mixed bird-parties in the British Isles tends, I think, to escape notice to some extent through the fact that the intervening spaces are well filled up by scattered birds that are searching for their food independently.

In south-east Africa, through the relative scarcity of intervening birds, they are far more conspicuous, and they would appear to be equally so in portions of South America, to judge from Bates's fascinating description of "the associated bands of insect-eaters" of the forests of the upper Amazons. Here "numbers of distinct species, belonging to many different families, join together in the chase or search for food"; and "One may pass several days without seeing many birds; but now and then the surrounding bushes and trees appear suddenly to swarm with them. There are scores, probably hundreds of birds, all moving about with the greatest activity—Woodpeckers and Dendro-

colaptidæ (from species no larger than a Sparrow to others the size of a Crow) running up the tree-trunks ; Tanagers, Ant-Thrushes, Humming-birds, Flycatchers, and Barbets flitting about the leaves and lower branches. The bustling crowd loses no time, and although moving in concert, each bird is occupied, on its own account, in searching bark or leaf or twig. . . . In a few minutes the host is gone and the forest path remains deserted and silent as before. . . . Sometimes stray birds, encountered in the line of march, are seen to be drawn into the throng, and purely frugivorous birds are now and then found mixed up with the rest, as though led away by some will-o'-the-wisp. . . . The simplest explanation appears to be this : that the birds associate in flocks from the instinct of self-preservation, and in order to be a less easy prey to hawks, snakes, and other enemies than they would be if feeding alone" \*.

Marshall, in his "Notes on Mashonaland Birds" (Ibis, 1900, p. 222), writes :—

"A fact which must impress every observer is the way in which one may often walk for several miles through likely-looking country and scarcely see a bird ; then suddenly one comes upon a troop of them, composed of Drongos, Tits, small Shrikes, Flycatchers, Warblers, and Buntings, keeping more or less together in a limited area. Personally I have no doubt that this may be attributed to the large number of birds of prey which occur here ; so that the smaller birds find it advisable to associate as a means of protection, the Drongos acting as a sort of body-guard."

I myself in my early notes "On the Birds of Gazaland" (Ibis, 1907, p. 34) wrote with regard to the same phenomenon :—

" . . . Though the habit is undoubtedly a great protection to the weaker species, and has evidently reached its present high development as a result of this, yet the fact that the small birds peculiar to the forest—the canopy and dense undergrowth of which ought to afford ample protection from the Hawks (and Hawks are in fact scarce in

\* 'The Naturalist on the Amazons,' vol ii. pp. 334 6, 1863 edition.

this district as compared with the neighbourhood of Salisbury)—also possess this habit . . . appears to me to indicate that it is due in part to mere social instinct.”

Sociableness, drawing the stray birds encountered into the passing throng, as Bates suggested, may account for the inclusion of purely frugivorous birds in these parties (if indeed they were not the nucleus round which the throng first formed), but neither this nor mutual protection nor protection by the Drongos now seems to me to be the *sole* objects of these mixed parties. I have during the past few years given much time to accompanying and closely watching such parties, and I have been led to believe, in common doubtless with numerous other observers, that their main function is co-operative hunting. They are probably *drives*.

The following is an instance from my journal in Gazaland:—

“April 18, 1911. Entering the forest, I found myself in the thick of a large ‘Drongo’s hunting-party.’ The birds had been quite undisturbed by my arrival and I was able to see within a few feet of myself a good deal of what was going on. The party was doing its work in nearly as close formation as I have seen, and from the ground to a height of 50 feet or more all was bustle and excitement. The twigs were everywhere vibrating and the foliage rustling with the movements of birds, scraps of bark and dry leaves were everywhere falling, and every now and then I was fortunate enough to witness an obvious attack on some flying or falling insect, often invisible to myself.

“The Bristle-necked Bulbuls (*Phyllastrephus capensis*), a large party of them, worked, as usual, below. They carefully searched not only the ground, knocking the dry leaves from side to side with their bills, but also the branches and foliage of the large shrubs forming the undergrowth. Amongst them I once for a minute or two caught a glimpse of a small family party of our common forest *Erithacus*.

“Next above came the Barratt’s Bulbuls (*P. flavistriatus*), a very large and scattered party or parties comprising probably not fewer than forty or fifty individuals in all. This party

seemed to make it its business, in ones or twos or threes, to search every inch of each trunk, each twig and each bunch of foliage from above and from below, from the *Macrorungias* inclusive up to the full height of 50 feet—perhaps higher, could I have seen further through the masses of foliage. They were probing crannies, picking loose scraps of bark from trunks and dead twigs, searching the dense green moss on the rainy sides of the former, deliberately shaking dead leaves or peering into their curled-up recesses and keeping the foliage generally in that continual rustle of movement to which I have already alluded.

“With the Barratt’s Bulbuls, but usually just above and to the side of some small working party, were a pair of forest Drongos (*Dicrurus ludwigi*) and of White-spotted Flycatchers (*Trochocercus albonotatus*). The Flycatchers were continuously on the move; when not watching the beaters and capturing what they put out (several attacks on minute flying objects within two or three feet of working Bulbuls were presumably of this nature), they kept flying off at small insects in mid-air or moving restlessly from twig to twig, often with the quaint tail-display they are so addicted to, and frequently removing small objects from the upper or under surfaces of leaves. They thus themselves took some small share in the ‘beating.’

“The Drongos far less: they confined themselves almost entirely to taking insects on the wing, several times dashing to within a foot or two of a ‘beater’ in pursuit of some object flushed by him. The only victim that I could definitely identify was a beetle, probably an Anthribid, that had been dislodged by a Bulbul and was falling to the ground when it was dexterously snapped up by a Drongo and carried to his perch nearly above my head. . . . Later on, two Barratt’s Bulbuls fell headlong in pursuit of an object dislodged by one of them, and one of the Drongos joined in. The object of their pursuit, whatever it was, reached the ground and one of the Bulbuls remained to search, while a third, from elsewhere, came and hovered over the spot for a few seconds, the Drongo and the second

original Bulbul returning to their previous occupations. On no fewer than seven separate occasions (including the one already described) I saw an insect or other object of interest to the birds fall to the ground in this way, having been dislodged by one or other of the Barratt's Buleuls. On each occasion from one to three of the Buleuls—occasionally fairly widely separated birds—dashed after it, and one or more, twice with the unsolicited assistance of a member or members of the *P. capensis* party, remained to search for it on the ground. Once I saw a *P. flavistriatus*, after rising from such a search, batter something against a twig, but on the remaining occasions I was unable to see whether the birds were successful or otherwise. I was interested to see (1) that the Bristle-necked Buleuls do not render their services as beaters for nothing; they evidently attempt to annex some at least of the crumbs that fall from above: and (2) that the trick of falling inertly to the ground practised by so many beetles, spiders, etc., and often so disconcerting to the naturalist, is not necessarily final as against birds of the 'searching' class.

"Once a 'Barratt' flew across a small open space, drove off a *Trochocercus* and took some small object from a leaf just in front of it. Another time a bird of the same species flushed and went after a small flying insect, but was at once joined in the pursuit by its next door neighbours of two or three feet away. One of them captured it in the air.

"A female *Batis erythrophthalma* remained more or less in sight for about ten minutes; I could hear another singing in the foliage some distance off. She, like the Drongo and the White-spotted Flycatchers, spent quite a good deal of her time in watching the Buleuls, though out of two or three objects seized by her in mid-air I am unable to say that any came from these birds; they were too small to see at all. Four times I saw her fly up and pick some insect from the underside of the leaves above her.

"A party of three or four *Apalis chirindensis*, searching closely high in the foliage, and a single *Cinnyris olivaceus*, were the only other birds seen; but the forest

Weaver, *Sycobrotus stictifrons*, a bird that is largely insectivorous and a close searcher, was several times heard. The Sunbird was picking small insects off both the upper and under sides of the leaves, sometimes perched on or hanging from the twig, at other times hovering in the air in front of the object desired. . . .”

The above description is of a very typical though incomplete mixed party of the forest. Probably still higher in the foliage and unseen by me on that particular occasion would have been the small Warblers, that are so commonly attached to these parties. A full list of the birds seen composing the forest-parties in Chirinda is roughly as follows:—*Dicrurus ludwigi* (Smith), usually a pair to a party; *Sycobrotus stictifrons* (Fischer & Reichw.), *Phyllastrephus milanajensis* Shelley, *Batis capensis erythrophthalma* Swyn., *Trochocercus albonotatus swynnertoni* Neum., *Trochocercus bivittatus* Reichw. (rare), and *Graucalus cæsius* (Licht.), a pair or occasionally two pairs of each; *Cinnyris olivaceus* Peters, and *Campotheru abingdoni* (Smith), occasionally a pair; *Smithornis cupensis* (Smith), occasionally, and *Erithacus swynnertoni* Shelley and *Tarsiger stellatus* (Vieill.) (somewhat rarely, I think, and probably usually only for a limited distance); *Apalis chirindensis* Shelley, and *Phyllastrephus capensis* (Swains.), in small or large parties—the numerous very small birds usually seen in the higher branches include the former species, also *Zosterops anders-oni*, Shelley (in large or small parties), *Chlorodyta neglecta* Alexander, *Cryptolopha ruficapilla* (Sundev.), and, I believe, *Phylloscopus trochilus* (Linn.), when with us. Finally there is the mainstay of the party, *Phyllastrephus flavistriatus* (Sharpe), present often in very great numbers. All these birds except the Drongos and Flycatchers are searchers.

On the outskirts (and for a very short distance into the forest) and in smaller, lower, or somewhat less dense forest-patches, as also often on the tree-tops and in open places in Chirinda itself, the following species attach themselves to these parties:—*Dryoscopus cubla* (Shaw), *Laniarius bertrandi* Shelley, *L. olivaceus* (Shaw), *L. manningi* Shelley, *Apalis*

*thoracica* (Shaw & Nodder), *Campephaga nigra* Vieill., *Barbatula bilineata* Sundev., *Cinnyris venustus niassæ* Reichw.—in each case singly or in pairs, or at most in small family parties; and, in family or larger parties, *Zosterops anderssoni*, *Anthreptes hypodilus* (Jardine), and *Pycnonotus layardi* Gurney.

On the other hand, in the “wooded pastures” (Welwitsch’s description, and quite the best I know for what Marshall calls “open forest”) the Drongo is *Dicrurus afer* (Licht.), not *Dicrurus ludwigi*, and the other birds of the assemblage are:—(1), in more or less large parties, *Sigmodus tricolor* (Gray), *Prionops talacoma* Smith, *Crateropus kirki* Sharpe (equivalent in its duties to *Phyllastrephus capensis* in the forest), *Eremomela scotops* Sundev., *Irisor erythrorhynchus* (Lath.), and sometimes *Pycnonotus layardi*; (2), in pairs or small parties, *Pycnonotus layardi*, *Emberiza major orientalis* (Shelley), *Parus niger* Bonn. & Vieill., *Nilaus brubru* (Lath.), *Dryoscopus cubla* (Shaw), *Sylvietta whytei* Shelley, *Prinia mystacea* Rüpp., *Alseonax subadusta* Shelley, *Batis molitor* (H. & K.), *Bradyornis murinus* Finsch & Hartl., *Graucalus pectoralis* Jard. & Selby, *Lophoceros melanoleucus* (Licht.), *Campothera bennetti* (Smith), *Dendropicus zanzibari* Mahl., and *Barbatula exoni* Layard (actually shot); (3), occasionally found, *Oriolus larvatus* Licht., *Hyphantornis nigriceps* Layard (near its haunts), *Sitagra ocularia* (Smith), *Estrilda kilimensis* (partly insectivorous), *Cinnyris niassæ* and *C. chalybæus* (Linn.), *Laniarius starki* Sel. f., *Telephonus senegalus* (Linn.), *Turdus tropicalis* Peters, and *Rhinopomastus cyanomelas* (Vieill.); also (purely frugivorous) *Colius striatus minor* Cab., and *Gallirex porphyreolophus* (Vigors), and (graminivorous) *Chalcopelia afra* (Linn.). I have also found *Campephaga nigra* Vieill., *Bradyornis ater* Sundev., and *Heliolais erythroptera* (Jard.), in these parties. Their most constant members, actually, are *Dicrurus afer*, the Helmet-Shrikes, the *Crateropus*, *Batis molitor*, *Bradyornis murinus*, and *Graucalus pectoralis*.

Each party has its special area of forest or wooded pasture

which it may be found driving systematically daily, 100 to 200 acres or so to a party I should guess for Chirinda, far more in the less densely-wooded country.

Gregariousness in a species is primarily, of course, the result of quite other factors than the need for co-operative insect-hunting, as witness the flocks of seed-eating birds. But one notices that the members of family parties of all kinds of insectivorous birds play greatly into each other's bills, and instances of more highly organized co-operation are afforded by such birds as *Creatophora carunculata* (in its locust drives) and *Bucorax caffer*. My two tame individuals, of the latter species whose habits I recently described in the S. A. O. U. Journal (vol. ix. 1913, p. 83), would stalk along side by side at some little distance apart and attack such insects as were flushed by either of them in the direction of the other. And I have watched parties of as many as four of the wild birds of the same species doing the same thing.

This is co-operation pure and simple. The next step is to have noticed that other species of birds (like grass-fires) tend, in rummaging about, to put up insects, and to attach yourself to them when you see them thus promisingly engaged. The following extracts from my bird-diary are typical of what I have frequently seen:—

“April 8, 1911.—. . . In the guavas was a party of not fewer than a dozen Bulbuls (*Pycnonotus layardi*) moving actively all over the bushes and pecking at the ripe guavas; outside, hawking backwards and forwards over and round the bushes and evidently, with the Bee-eater, snapping up such flying insects as were dislodged by the Bulbuls, were five or six Swallows (*Psalidoprocne orientalis*). Only one of the insects captured was large enough for me to distinguish. It was either a common yellow-legged wasp (*Scolius* sp.) or some black-winged species closely resembling it in appearance. It flew from the Bulbuls and was at once snapped up by the Bee-eater. The line of guava-bushes is divided into two by a considerable gap, and it was noteworthy that the Bee-eater (which was joined for a few minutes by a second)



and the Swallows kept strictly to whichever section the Bulbuls happened to be in at the moment, crossing over when they crossed.

“Curiously enough I yesterday afternoon saw Bulbuls taking the Bee-eater’s rôle of to-day. A party of *Estrilda astrild* was following the sunk fence, seed-hunting as is their wont; above them, keeping mostly a few feet up in the higher vegetation, was a party of seven or eight *P. layardi*, which were keeping pace with them for the sake of the insects put out by the Waxbills. A male Bishop-bird in full plumage (*Pyromelana capensis xanthomelæna*) and two or three of his hens were also of the party and were sometimes in the grass, sometimes with the Bulbuls. A little lower down the slope a smaller detached party of *Estrilda astrild* was similarly seed-hunting in the grass about the foot of a young Indian ‘sissoo,’ and in the sissoo was a solitary Bulbul watching them.”

The closely searching birds of the large mixed parties are to each other and to the Drongos and Flycatchers that attend them what the Waxbills of the above observations were to the Bulbuls and the Bulbuls to the Bee-eater. I have even seen birds attending a party of monkeys that was moving through the tree-tops in Chirinda.

While, however, I feel that the mixed parties are primarily drives, and the Drongo from this standpoint mainly parasitic, it is, I think, likely that the great “mobbing” power afforded by numbers must be so great an advantage as to probably act as a contributing factor. I think, too, that the Drongo, with his boldness and readiness to attack, quite likely fully “pays for his keep.”

The fact of systematic co-operative hunting on so large a scale suggests the views on mutual aid amongst animals that have been laid stress on by some Russian naturalists; yet is of *particular* interest as suggesting how keen selection must sometimes be and how baseless, probably, is the view that the more perfect defensive adaptations of insects constitute hypertely.